

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A plasma processing apparatus for performing a process on a substrate (11) by exposing the substrate to a plasma generation region (22), the apparatus comprising:

a first chamber (1) for accommodating therein the substrate (11);

a top plate unit (4) serving as a part of partition walls of the chamber (1); and

a second chamber including of a dielectric top plate unit, the second chamber being disposed on an upper portion of the first chamber; and

an antenna unit (3) for supplying a high frequency electromagnetic field into the chamber (1) to directly form the plasma generation region (22) in a region between the top plate unit (4) and the substrate (11) accommodated in the chamber (1) having a plurality of slots for irradiating a microwave towards an inside of the first chamber through the top plate unit, the antenna being disposed on the second chamber,

wherein the top plate unit (4) includes:

a dielectric flat plate portion (4a) ~~disposed~~ formed to face the substrate (11)

and being in contact with the antenna unit (3); and

a dielectric side wall portion (4b) formed to extend from a peripheral region of the flat plate portion (4a) towards a ~~side where~~ the substrate (11) is disposed, and

wherein sides of the flat plate portion (4a) and the side wall portion (4b) facing the plasma generation region (22) have a smooth and curved surface extending between the flat plate portion (4a) and the side wall portion (4b) has a thickness not smaller than $\lambda_g/4$ but not greater than λ_g , λ_g being a wavelength of the microwave.

Claims 2-4 (Canceled).

Claim 5 (Currently Amended): The plasma processing apparatus of claim 1, further comprising a gas injection opening ~~(13)~~ for supplying a gas into the first chamber ~~(1)~~, wherein the gas injection opening ~~(13)~~ is disposed to inject the gas along the side wall portion ~~(4b)~~.

Claim 6 (Currently Amended): The plasma processing apparatus of claim 1, wherein ~~the chamber (1) includes a conductive portion (1) being in contact with~~ an outer periphery of the side wall portion ~~(4b)~~ is covered with a conductor.

Claim 7 (Currently Amended): The plasma processing apparatus of claim 1, wherein an inner shape of the ~~top plate unit (4)~~ second chamber is of a bell jar type.

Claim 8 (Canceled).

Claim 9 (Currently Amended): The plasma processing apparatus of claim ~~[[1]]~~ 6, wherein a gap is provided between the side wall portion ~~(4b) of the top plate unit (4)~~ and the ~~chamber (1)~~ conductor.

Claim 10 (Currently Amended): The plasma processing apparatus of claim ~~[[1]]~~ 6, wherein the side wall portion ~~(4b) of the top plate unit (4)~~ is in close contact with the ~~chamber (1)~~ conductor without having a gap therebetween.

Claim 11 (Currently Amended): A plasma processing apparatus for performing a process on a substrate (11) by exposing the substrate to a plasma generation region (22), the apparatus comprising:

a first chamber (1) for accommodating therein the substrate (11);

a top plate unit (4) serving as a part of partition walls of the chamber (1); and

a second chamber including a dielectric top plate unit, the second chamber being disposed on an upper portion of the first chamber; and

an antenna unit (3) for supplying a high frequency electromagnetic field into the chamber (1) to directly form the plasma generation region (22) in a region between the top plate unit (4) and the substrate (11) accommodated in the chamber (1) having a plurality of slots for irradiating a microwave towards an inside of the first chamber through the top plate unit, the antenna being disposed on the second chamber,

wherein the top plate unit (4) includes:

a dielectric flat plate portion (4a) disposed to face the substrate (11) and being in contact with the antenna unit (3); and

a dielectric side wall portion (4b) formed to extend from a peripheral region of the flat plate portion (4a) towards a side where the substrate (11) is disposed, and

wherein a thickness of the side wall portion (4b) is smaller than that of the flat plate portion (4a) a gap distance between the top plate unit and the antenna is equal to or smaller than $\lambda_g/10$, λ_g being a wavelength of the microwave.

Claim 12 (Canceled).

Claim 13 (Currently Amended): The plasma processing apparatus of claim ~~[[11]]~~ 20, wherein a gap is provided between the side wall portion (4b) of the top plate unit (4) and the chamber (1) the conductor.

Claim 14 (Currently Amended): The plasma processing apparatus of claim ~~[[11]]~~ 20, wherein the side wall portion (4b) of the top plate unit (4) is in close contact with the chamber (1) the conductor without having a gap therebetween.

Claim 15 (Currently Amended): The plasma processing apparatus of claim 11, wherein the side wall portion (4b) has a thickness of $\lambda_g/4$ or greater not smaller than $\lambda_g/4$ but not greater than λ_g , λ_g being a wavelength of ~~a high frequency electromagnetic field based on a dielectric constant of the top plate unit (4)~~ the microwave.

Claim 16 (Canceled).

Claim 17 (Currently Amended): The plasma processing apparatus of claim 11, wherein ~~sides of the flat plate portion (4a) and the side wall portion (4b)~~ a portion of the second chamber facing the plasma ~~generation region (22)~~ have a ~~smooth and~~ curved surface extending between the flat plate portion (4a) and the side wall portion (4b).

Claim 18 (Currently Amended): The plasma processing apparatus of claim ~~[[17]]~~ 11, wherein an inner shape of the ~~top plate unit (4)~~ second chamber is of a bell jar type.

Claim 19 (Currently Amended): The plasma processing apparatus of claim 11, comprising a gas injection opening (13) for supplying a gas into the first chamber (1),

wherein the gas injection opening ~~(13)~~ is disposed to inject the gas along the side wall portion ~~(4b)~~.

Claim 20 (Currently Amended): The plasma processing apparatus of claim 11, wherein ~~the chamber (1) includes a conductive portion (1) being in contact with~~ an outer periphery of the side wall portion ~~(4b)~~ is covered with a conductor.

Claim 21 (New): The plasma processing apparatus of claim 1, wherein a portion of the second chamber facing the plasma have a curved surface extending between the flat plate portion and the side wall portion.

Claim 22 (New): The plasma processing apparatus of claim 11, wherein a thickness of the side wall portion is smaller than that of the flat plate portion.